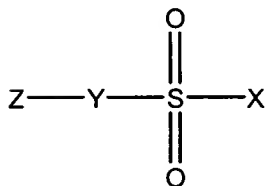


## CLAIMS

1. A system adapted for use in a health-related environment comprising:

a biofilm resistant surface comprising an effective amount of bioavailable anti-fouling compound represented by general structure 1:



1

wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

$\text{R}_{80}$  represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive, and

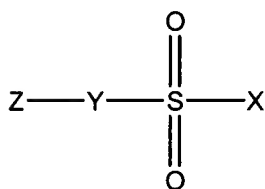
wherein the compound is released from the surface.

2. The system of claim 1, wherein X represents -OH, F, Cl, or Br.
3. The system of claim 1 wherein Y represents O.
4. The system of claim 1, wherein Z represents optionally substituted alkyl, aryl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ .
5. The system of claim 1 wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

6. The system of claim 1, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
7. The system of claim 1, wherein R represents H or alkyl.
8. The system of claim 1 wherein X represents -OH, F, Cl, or Br; and Y represents O.
9. The system of claim 1 wherein X represents -OH or Cl; and Y represents O.
10. The system of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
11. The system of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
12. The system of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
13. The system of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
14. The system of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
15. The system of claim 1, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
16. The system of claim 1, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
17. The system of claim 1, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
18. The system of claim 1, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
19. The system of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .

20. The system of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
21. The system of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
22. The system of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
23. The system of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
24. The system of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
25. The system of claim 1 wherein the biofilm resistant surface comprises a coating.
26. The system of claim 25, wherein the coating is applied to a medical device.
27. The system of claim 25, wherein the coating is applied to an implant
28. The system of claim 25; wherein the coating is applied to a graft.
29. The system of claim 1, wherein the effective amount decreases the amount of plant pathogens attached to a plant or plant component over a defined period of time by a factor of 4 relative to control that does not comprise the compound.
30. The system of claim 1, wherein the bioavailable antifouling compound is released from the biofilm resistant surface at a rate ranging from about 1 to about  $200 \mu\text{gcm}^2\text{d}^{-1}$ .
31. The system of claim 1, wherein the effective amount of bioavailable antifouling compound is in the range of about 0.01% to 6%.
32. The system of claim 1, wherein the bioavailable antifouling compound is released from the biofilm resistant surface as a sustained release.

33. The system of claim 1, wherein the bioavailable antifouling compound is released from the biofilm resistant surface at a preselected rate
34. The system of claim 1, wherein the biofilm resistant surface is applied to an exterior surface of a living organism.
35. The system of claim 34, wherein the bioavailable antifouling compound is carried in a vehicle adapted for application to the exterior surface of the living organism.
36. The system of claim 35, wherein the vehicle is selected from the group consisting of liquids, gels, powders, ointments, salves, creams, pastes and paints.
37. The system of claim 1, wherein the bioavailable antifouling compound is applied to an epidermal surface of a human being.
38. The system of claim 1, wherein the bioavailable antifouling compound is released by a material incorporated as part of a medical device and wherein the biofilm-resistant surface is a surface of the medical device.
39. A coating comprising an effective amount of a bioavailable anti-fouling compound represented by general structure 1:



1

wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or  $-(\text{CH}_2)_m\text{-R}_{80}$ ;

$\text{R}_{80}$  represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive,

wherein the coating is applied to a surface of an article selected from the group consisting of grafts, implants and medical devices, and wherein the coating releases the compound when in contact with the surface, thereby impairing biofilm formation on the surface.

40. The coating of claim 39, wherein X represents -OH, F, Cl, or Br.
41. The coating of claim 39, wherein Y represents O.
42. The coating of claim 39, wherein Z represents optionally substituted alkyl, aryl, or -  
(CH<sub>2</sub>)<sub>m</sub>-R<sub>80</sub>.
43. The coating of claim 39, wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
44. The coating of claim 39, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
45. The coating of claim 39, wherein R represents H or alkyl.
46. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; and Y represents O.
47. The coating of claim 39, wherein X represents -OH or Cl; and Y represents O.
48. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or -(CH<sub>2</sub>)<sub>m</sub>-R<sub>80</sub>.
49. The coating of claim 39, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or -(CH<sub>2</sub>)<sub>m</sub>-R<sub>80</sub>.
50. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
51. The coating of claim 39, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
52. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
53. The coating of claim 39, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

- <sup>54</sup>  
52. The coating of claim 39, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
- <sup>55</sup>  
53. The coating of claim 39, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
- <sup>56</sup>  
54. The coating of claim 39, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
- <sup>57</sup>  
55. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
- <sup>58</sup>  
56. The coating of claim 39, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or  $-(CH_2)_m-R_{80}$ .
- <sup>59</sup>  
57. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
- <sup>60</sup>  
58. The coating of claim 39, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.
- <sup>61</sup>  
59. The coating of claim 39, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
- <sup>62</sup>  
60. The coating of claim 39, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.
- <sup>63</sup>  
61. The coating of claim 39, wherein the coating is temporary
- <sup>64</sup>  
62. The coating of claim 39, wherein the coating is permanent.
- <sup>65</sup>  
63. The coating of claim 39, wherein the effective amount decreases the amount of plant pathogens attached to a plant or plant component over a defined period of time by a factor of 4 relative to control that does not comprise the compound.

R126

66

64. The coating of claim 39, wherein the release rate of the compound from the surface is in the range of about 1 to about  $200\mu\text{gcm}^2\text{d}^{-1}$ .

67

65. The coating of claim 39, wherein the effective amount of bioavailable antifouling compound is in the range of 0.01% to 6%.

68

66. The coating of claim 39, wherein the release of the compound is a sustained release.

69

67. The coating of claim 39, wherein the release of the compound is at a preselected rate.

70

68. The coating of claim 39, wherein the coating is formulated as a composition selected from the group consisting of gas, vapor, aerosol, paste, gel, liquid, wax, caulk, adhesive, polymerizable compositions and paint..

71

69. The coating of claim 39, wherein the article can be implanted in a living body.

72

70. The coating of claim 39, wherein the article can be inserted in a living body.

73

71. The coating of claim 39, wherein the article can be applied to a living body.

74

72. The coating of claim 39, wherein the coating is employed as an agent selected from the group consisting of glue, cement and adhesive.

75

73. An article of manufacture adapted for use in a health-related environment, comprising:

a surface,

a bioavailable antifouling compound adapted for contact with the surface, and

a delivery system whereby delivery of an effective amount of the bioavailable antifouling compound to the surface is effected, thereby to inhibit formation of a biofilm on the surface, said delivery system being incorporated into a component of the article of manufacture.

76

74. The article of manufacture of claim 73, wherein the article of manufacture is adapted for implantation into a living body.

77

75. The article of manufacture of claim 73, wherein the article of manufacture is adapted for insertion into a living body.

78

76. The article of manufacture of claim 73, wherein the article of manufacture is adapted for application to a living body.

79

77. The article of manufacture according to claim 73, wherein the article of manufacture is selected from the group consisting of vascular catheters, urological catheters, stents, grafts, valves, orthopedic implants, joint replacements, tubes, intrauterine devices,

conduits, wires, [REDACTED]ies, sutures, electronic instruments, infusion pumps, prostheses, contour-altering implants, stabilizing implants, tissue expanders, shunts and drains.

- <sup>80</sup>  
78. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is selected from the group consisting of wound dressings, contact lenses, casts, appliances, wound packing materials, obturators, condoms, diaphragms, tampons, films, adhesives, collection bags and adherent drug delivery systems.
- <sup>81</sup>  
79. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for use in a cardiovascular structure of a human body.
- <sup>82</sup>  
80. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for use in a genitourinary structure of a human body.
- <sup>83</sup>  
81. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for use in a gastrointestinal structure of a human body.
- <sup>84</sup>  
82. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for use in a hepatopancreaticobiliary structure of a human body.
- <sup>85</sup>  
83. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for use on an epidermal surface of a human body.
- <sup>86</sup>  
84. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture is adapted for insertion into a body lumen.
- <sup>87</sup>  
85. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture comprises a surgical mesh.
- <sup>88</sup>  
86. The article of manufacture according to claim <sup>75</sup>~~73~~, wherein the article of manufacture comprises a suture.